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Representational Forms: Storytelling of Climate Change

Hayden Cudaback

University of Nebraska-Lincoln

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Representational Forms:

storytelling of climate change

Representational Forms:

storytelling of climate change

by
Hayden Cudaback

A Design Thesis
Presented to the Faculty of
The College of Architecture at the University of Nebraska-Lincoln

In Partial Fulfillment of Requirements
For the Degree of Master of Architecture
Major: Architecture

Under the Supervision of Professor David Newton
Lincoln, Nebraska
May, 2020

I can't see it. I can't touch it.
But I know it exists, and I know I'm part of it.
I should care about it.

acknowledgments

To David Newton, my thesis advisor, for sharing your ideas, vast knowledge, and endless supply of books

To Catherine Rock, for your unwavering support and patience, and making sure I was fed and caffeinated

To my parents and siblings, for being understanding when I would not return your texts, and loving me unconditionally

To my fellow thesis students, for being the best social breaks. I didn't realize how much I enjoyed you all until we had to vacate the Attic

To my grandfather Roger Cudaback, you were the cardinal on my shoulder

contents

introduction	
abstract	13
thesis statement	17
research	
architecture + climate change	20
architecture + activism	28
propaganda	36
architecture + storytelling	40
methodology	46
The Story Begins Now.	61
conclusion	86
bibliography	89

introduction



coal plant
centralia, wa

Climate change is recognized as one of the biggest threats to our natural world and its biodiversity, as well as to global security, human health and well-being. We are already witnessing the early effects of climate change, with more frequent, extreme weather events and changing seasonal patterns being seen around the world.

Climate change is a complex object that you can't physically connect with. Its effects can be felt, but climate change itself is an entity that people can't understand the depth and magnitude. This characteristic of climate change makes any depiction related to its effects static and two dimensional. Climate change is more than one cause and one effect; but acts as a network of relationships.



wildfire
northwest territories, canada

Climate change is the fundamental design problem of our time. All other concerns, though many profoundly important, are nonetheless secondary. The threat climate change poses is existential, and buildings are hugely complicit as they consume 40% of the energy in the US annually, and emit nearly half of the carbon dioxide.

Architects face a choice: to remake the built environment so that it produces a less harmful result, or to carry on and live with the consequences.

This thesis investigates
activist representatino in
architectural design as it
relates to climate change

research

architecture + climate change

According to the US Green Buildings, buildings in the United States are responsible for 39% of primary energy use, the highest of any sector for the United States.

Presently, architecture's reaction to climate change is seen in the creation of environmental standards, disciplinary debate, and education within the discipline.

The creation of standards such as LEED and the concept of sustainable design has led to the thought that 'if it isn't LEED, it isn't 'green.' This thinking has a damaged view on the role of 'sustainable' architecture. Certainly sustainable or 'green' buildings are becoming

increasingly popular, However, it appears that these buildings are not always built with longevity in mind. This results in environmental, economical, and social impacts that can reduce the positive impact of these so-called green buildings.



ImaginOn
Gantt Huberman Architects
Holzman Moss Bottino Architecture

The requirements to reach LEED status have become more easily attainable as they have been written into building codes across the country. Thus, buildings can achieve a green status with minimal impact. For example, In 2006, the ImaginOn building was awarded LEED certification at the silver level by documenting their construction process, reducing energy consumption, using recycled or environmentally sustainable materials, and educating the public about their efforts. Since its construction, the building uses nearly twice as much energy as predicted, and more than a non-LEED building, but maintains its certification despite the poor energy record.

This becomes an example where certification is the primary goal rather than environmental responsibility.



Milwaukee Urban Ecology Center
Kubala Washatko Architects

LEED has become expensive, slow, and confusing. LEED certification typically costs 1-5% of cost to the budget. Milwaukee's Urban Ecology Center is one of the 'greenest' buildings in the upper Midwest, but it is not LEED certified. The head architect for this project steered clear of pursuing LEED because it could have added as much as \$75000 to the cost just for the paperwork.



The Rucksack House
Stefan Eberstadt

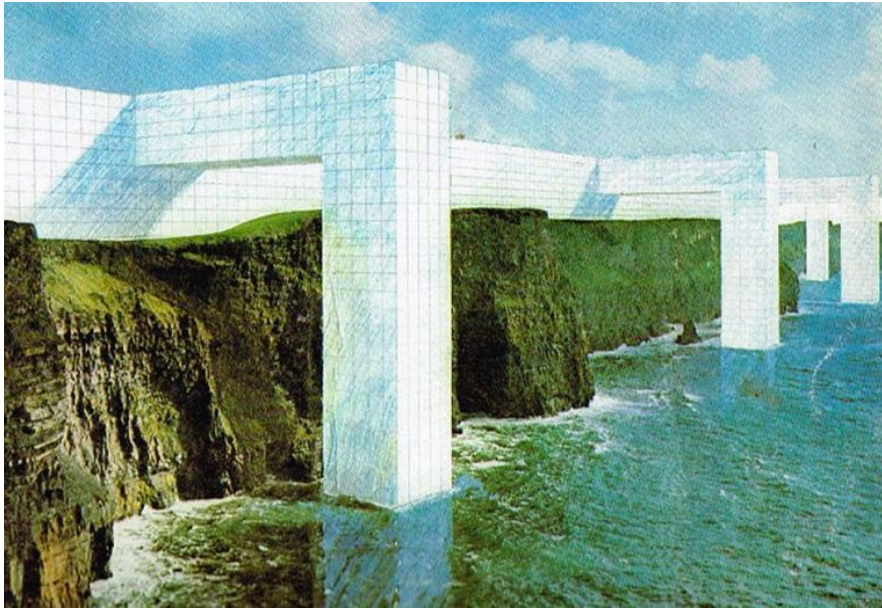
This thesis is an exploration of the future of architecture as it succumbs to the forces of climate change. I propose the current practice of architecture does not respond to climate change as a proper threat, but uses band-aid solutions in a post construction practice.

For example the Rucksack House designed by Stefan Eberstadt acts as an additional room that can be suspended from the façade of any residential building. The extra room is used as an adaptation to a low-light, and cramped apartment.

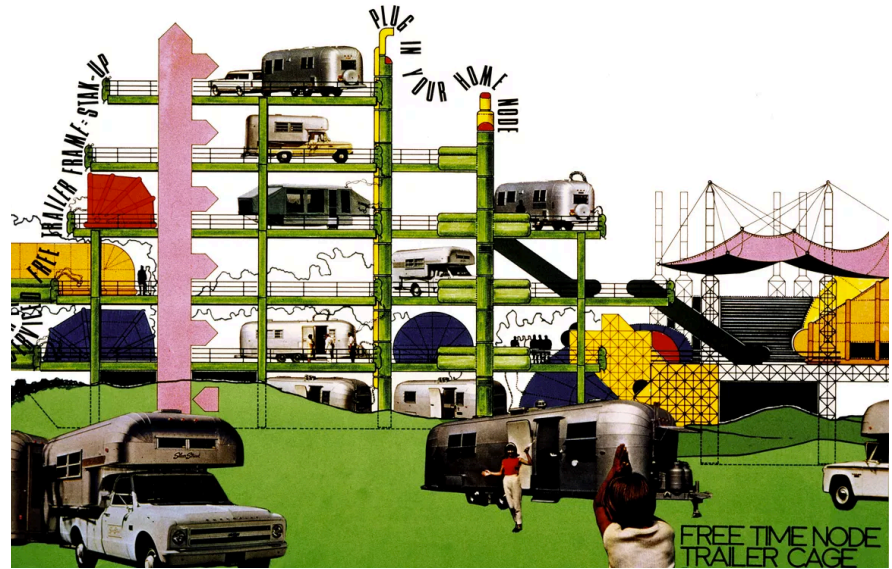
The field's idea of 'sustainability' and 'high-performance building' has damaged the opportunity to design for prevention, and we can only design for adaptation.

architecture + activism

Architecture is inherently linked to policy, politics, and power. With responsibility for the design and perception of the built environment, architects have a distinct role in shaping the human urban experience. In a society where heart and mind are entwined, any movement for change must likewise entwine the emotive and cognitive. The arrival of artistic activism has therefore unveiled a powerful, underutilized tool of social justice.



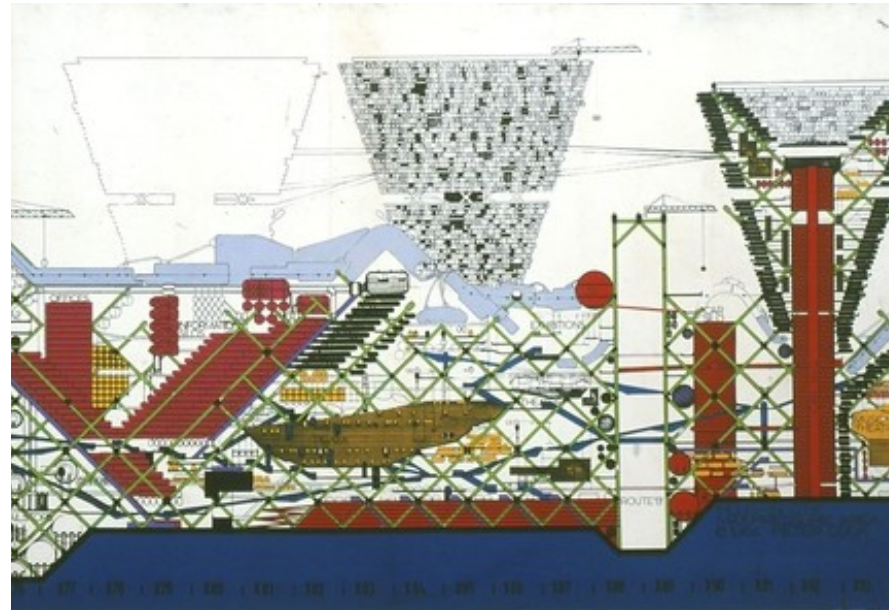
The Continuous Monument
Superstudio



Free Time Node Trailer Cage
Archigram



The Continuous Monument
Superstudio



Instant City
Archigram

The Avant-garde architecture groups of the 1960s and 1970s were looking to redefine the discipline. These groups had a common goal, assert architecture once again as an autonomous discipline, as a political provocateur, and a means of social satire.

The projects during this time were accepted as conceptual and contradictory. Pino Brugrellis and Manuel Orazi explain this in their book *Radical Utopias* by saying “they are susceptible to different interpretations and meanings, without ever exhausting their explosive charge.” This means projects with multiple interpretations can have a timeless presence.

Utopias became a topic for projects as a chance to address the environmental context of the time period. Jimenez Lai states the importance as a “mechanism for architects to operate a journalists using the design of spaces to communicate and narrate the world back to us through new lenses.



Rocinha: The pedreiro and the master planner

Informal builder Ricardo de Oliveira struggles with the government's plan for the future of Rio's Rocinha favela.

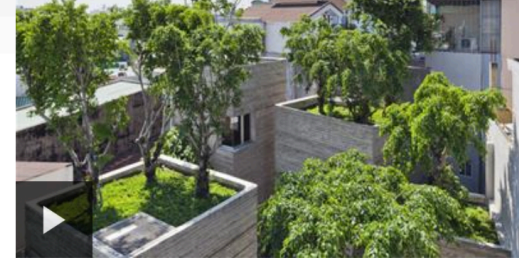
[Arts & Culture](#), [Urbanisation](#), [Latin America](#), [Brazil](#), [Slums](#)



Working on water

Architect Kunle Adeyemi sets out to solve the issues of flooding and overcrowding in Nigeria's waterside slums.

[Nigeria](#), [Poverty & Development](#), [Africa](#), [Urbanisation](#)



Greening the city

Vo Trong Nghia attempts to return greenery to Vietnam's choking cities and design affordable homes for poor communities.

[Environment](#), [Poverty & Development](#), [Vietnam](#), [Asia Pacific](#)



Israel: The architecture of violence

Eyal Weizman explains architecture's key role in the Israeli occupation of Palestine and the evolution of urban warfare.

[Human Rights](#), [Israel](#), [Palestine](#), [War](#), [War & Conflict](#)



Guerrilla architect

Can Spanish self-build legend Santiago Cirugeda turn an abandoned factory into a vibrant cultural centre?

[Urbanisation](#), [Business & Economy](#), [Europe](#), [Spain](#)



Yasmeen Lari: 'On the road to self-reliance'

Pakistan's first female architect is one of the most successful providers of disaster relief shelters in the world.

[Humanitarian crises](#), [Pakistan](#)

The concept of the architect as an influential change-maker has now also filtered into the public imaginary with shows such as Al Jazeera's Rebel Architecture being widely followed and discussed by many unfamiliar to the profession.

Jazeera followed architects who are using design as a form of activism and resistance to tackle the world's urban, environmental and social crises, and released the work as a six-part documentary.

This documentary series uses a form of digital activism to highlight on activist architects as a method to celebrate and share work that would more than likely never be recognized by the field. These architects believe architecture

can do more than iconic towers and luxury flats, turning away from elite "starchitecture" to design for the majority masses.



The climate is ripe for architects who wish to exhibit a social agenda through their design process and built work. The power of design as activism lies in the unique ability of art to break the emotional barriers of the observer.

If extending a call to action to the masses is the goal of activist work, then social media becomes the communication tool. The rise of hashtags such as #blacklivesmatter, #metoo, and #maga begin to create discussion that moves from a digital platform to face-to-face discussions.

Activist movements show their effectiveness and viability of using social media for political engagement with the public. Social media is now

being used as a source of news and information due to its accessibility and speed at which information can be obtained.

The architect can take a role in this online dimension as a mediator between the profession and the public.

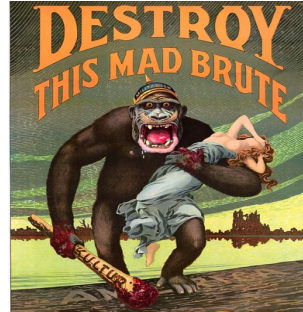
propaganda

Propaganda is a system of be impressed upon others. information or ideas that is expanded for the purpose of promoting a cause, or influencing feelings or actions. All representation is biased, and can be negative or positive. Propaganda pushes biases as the method in which the information is represented. Propaganda provides techniques of how biased data is spread effectively.

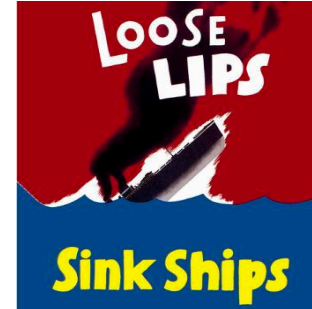
Propaganda in architecture is the use of architecture to communicate an attitude or idea in a persuasive manner. The architecture itself becomes an expression of the larger opinions of a cultural or social group which may then



MENTAL IMAGE / a
world without
bees?



GENERATING FEAR
/ wwi
recruitment



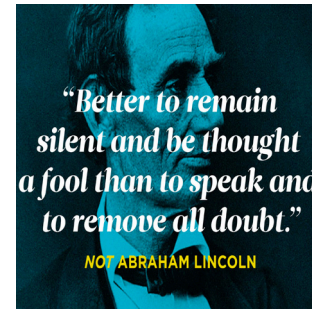
SLOGAN / wwii
recruitment



OVERSTATING
PARTICIPATION /
wwi recruitment



PROMISED
HAPPINESS / taco
bell ad



MISQUOTING /
false abraham
lincoln quote



FALSE IMAGE /
ronald reagan
chopping wood



FALSE DILEMMA /
usa button



ASSERTION /
maybelline ad

Propaganda is a system of be impressed upon others. information or ideas that is expanded for the purpose of Propaganda in architecture promoting a cause, or influencing does not build, but represents. feelings or actions. All representation is biased, and can be negative or positive. Propaganda pushes biases as the method in which the information is represented. Propaganda provides techniques of how biased data is spread effectively.

Propaganda in architecture is the use of architecture to communicate an attitude or idea in a persuasive manner. The architecture itself becomes an expression of the larger opinions of a cultural or social group which may then

architecture + storytelling

All designed objects, whether conceived by an architect, artist, industrial designer, or landscape architect, tell a story. Architects have long sought to communicate their craft through their building imagery. Including a story in a building creates a level of meaning and connection to the patron or user that can be engaging and provoking. The ability for the observer to learn something beyond the obvious causes them to remain rather than pass by. However, storytelling in architecture lacks the journey of multiple characters.



In building, we know the story of the user and we design vicariously through their vision. However, we do not often get the opportunity to design for multiple users in different divisions of life.

Storytelling tactics used in games like Dungeons and Dragons give the storyteller a chance to develop a deeper story for, and about the users. Their storytelling is also supplemented by visual model-like game boards. Multiple scales are often used on one game board depending on the narrative as a method to understand units of travel for characters. This allows the game players to fully interact with the storyline as they are able to achieve a better mindset with their character.



Romania

"I was born in communist time." My grandfather didn't believe in God, he believed in communism. He was waiting until his death for communism to arise again. The communistic thoughts had been disappearing from people's minds over the years, but he kept on waiting. It didn't happen a long time ago, but somehow it seemed to be another era...another country. Our naivety and good nature remained there.

You could feel the change coming. Something was going to be different in the following years. You could witness how society's habits where more and more influenced by Western cultures, but at the same time no one felt to be a real part of the western world. Soon the time in which we could only imagine life outside the confines was over. You could clearly see the glimmer of hope people developed. The newly gained freedom felt great. Finally we were allowed to travel through different unknown countries which for a long time, appeared to be so far away from us.

The Schengen agreement should have given us the opportunity to finally become a part of the Western world. However, the assimilation had been delayed for another few years, because EU subsidies had fallen into the wrong hands and finally vanished in the corrupt system. We didn't manage to make enough progress regarding the fight against corruption and organized crime.

The first success against the deadly corruption was marked by the *"Revolution of Decency"* which was enforced by the citizens' anger towards it. The politicians realised that they couldn't take decisions without having the support of their citizens. People no longer wanted to be part in activities related to bribes.

Now... it has crumbled, the structure we had believed in and fought for in vain for years. After such a long fight it is bitter to realise that we haven't managed to become a part of it.

We are captured. Enclosed, between communism and a crumbling eurozone which closes itself to us.

Today



Tomorrow



The Austria based group TAB focuses on social and cultural topics in connection with architecture, urbanism, and design as part of their storytelling methods. Their project The Golden Age of Nothing is a dystopia-based project on recent events happening in and around Europe.

In this work Europe has fallen apart, and new alliances and borders were created. The format is presented as a book told by 19 different fictional characters in their 19 different countries. Each character describes how their life has changed from the fall out and what it means for their future.

The storytelling here has a focus on architecture in the

writing, but is told similar to a subplot in cinematic works. This tactic engages the reader with the character on an emotional level and uses renders to describe how the architecture has changed.

methodology

This thesis focuses on model making, storytelling, and activist representation methods to project part of our world in the year 2100.

Storytelling of Climate Change is a physical and written exploration of the impact of climate change on the future of architecture. The exploration is told from the perspective of three Characters created from different levels of societal interaction, consumerist culture, and a lack of architectural intervention. They are known as The Beneficiary, The Worker, and The Scavenger. The three Characters together create the visual story of architecture's adaptation as well as create a deeper connection between human, earth, and our built

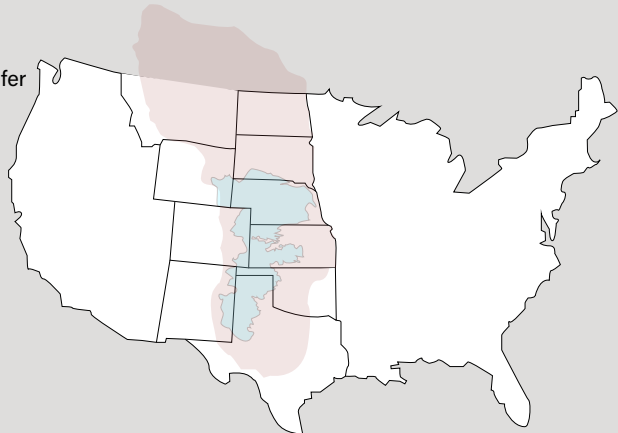
environment through the use of models.

The characters' world is shown through a series of models as part of an exhibition. The exhibition then travels to various locations as to reach a maximum amount of people as possible. The models themselves were created with an intention of realism as to engage an emotion reaction from viewers as they can easily picture these scenes.

Much like the previous groups and individuals, I position myself in a role to critique my social, political, and environmental surroundings such as political influence, power, and capitalism.

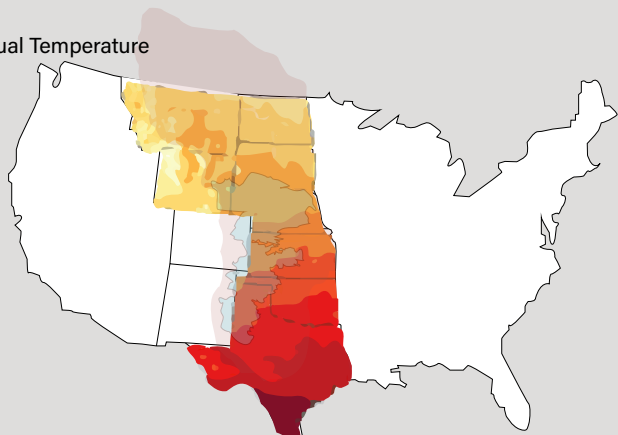
I must be part of our social, societal, and environmental surroundings in order to subvert the system. The flaws then become identifiable, reviewable, and adjustable. This becomes a moment of self-assessing my role in the system, and the system's role in a larger network.

Great Plains
Ogallala Aquifer

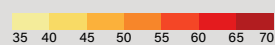


2019

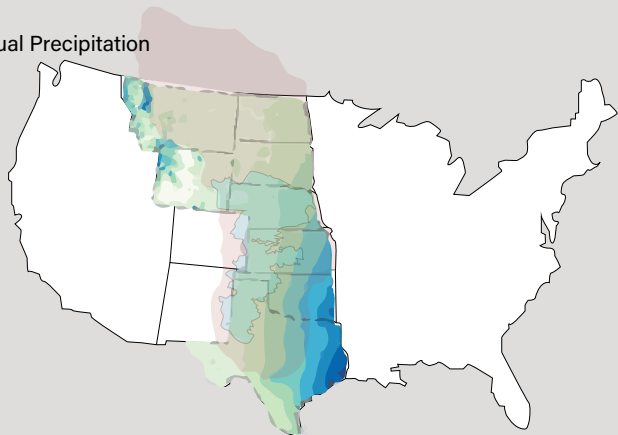
Average Annual Temperature
°F



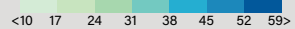
2019



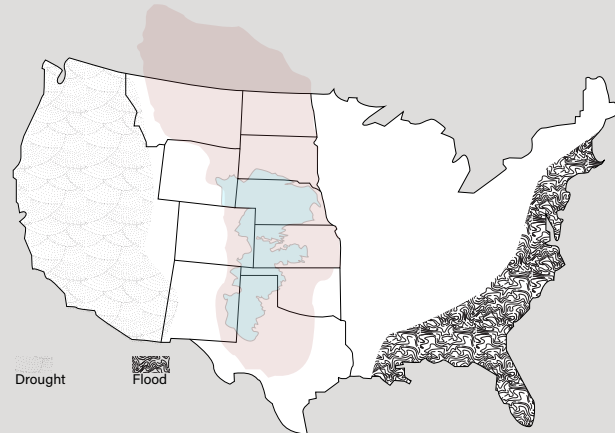
Average Annual Precipitation
Inches



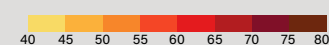
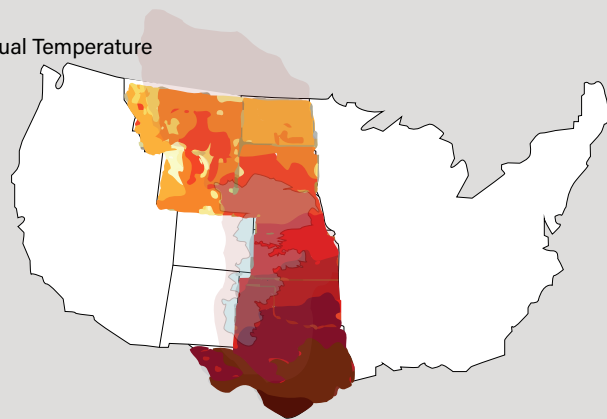
2019



Drought and
Flooding

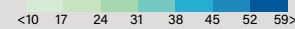
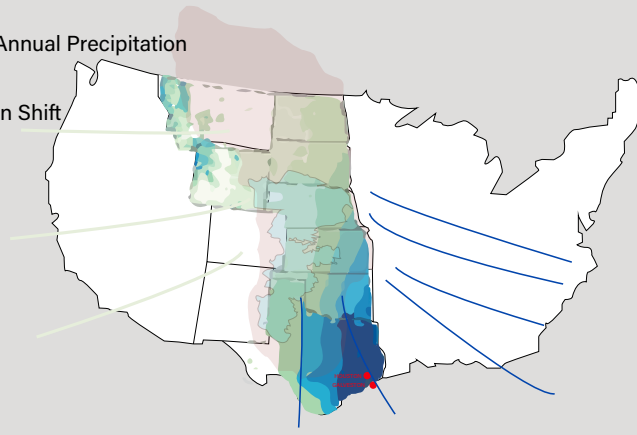


Average Annual Temperature
°F



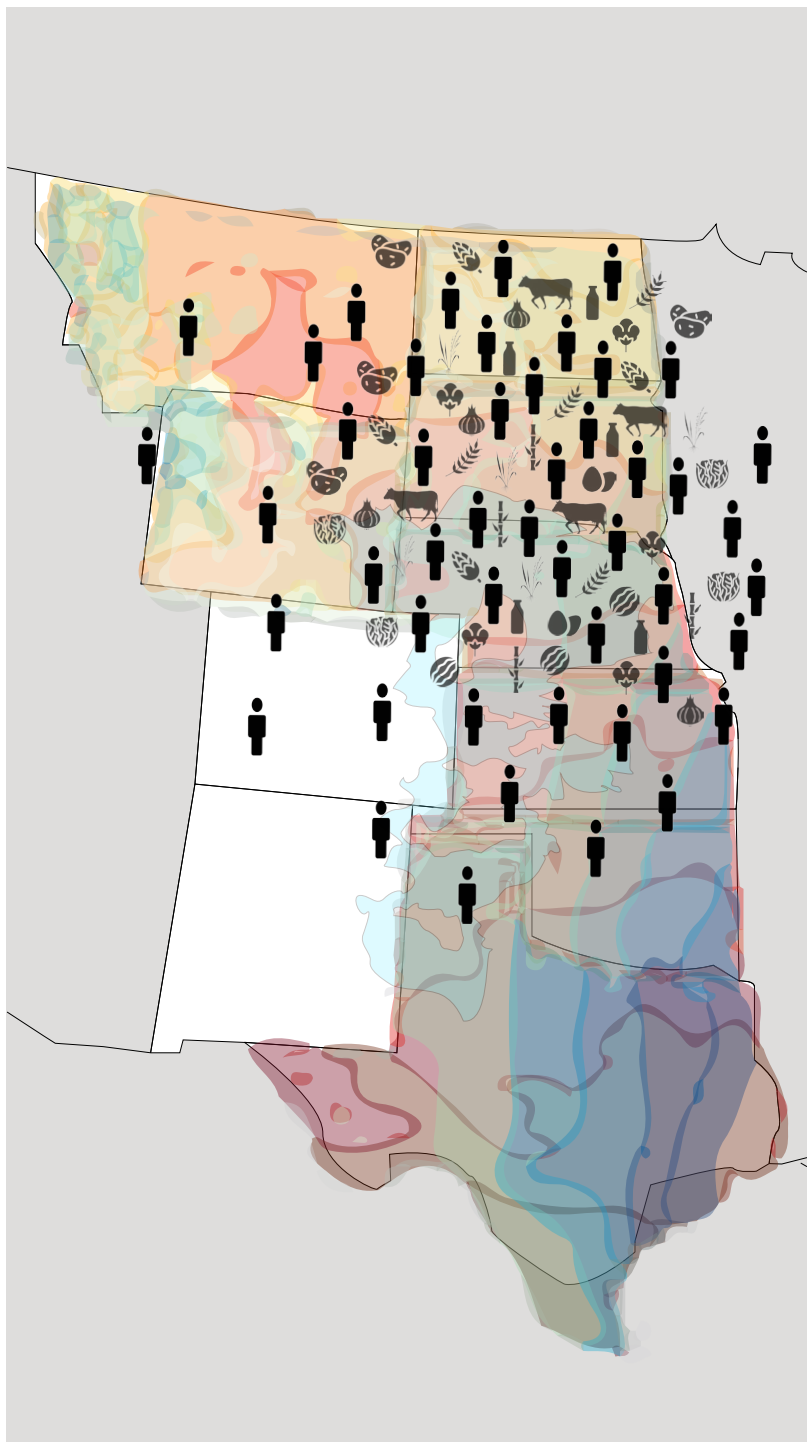
Average Annual Precipitation
Inches

Population Shift



I have focused my attention on the great plains as an opportunity to recognize the significance of these flyover states. Aquifer, and an increase in density and population as people flee from drought and flooding from the coasts.

I have mapped predictable changes to the great plains that come either as a direct impact from climate change or a ripple from another location. I have specifically left future dates off of the projected maps to avoid a mindset that this issue can be pushed off for another day. The Great Plains will experience an average yearly temperature rise of ten degrees Celsius, an average yearly precipitation rise of fifteen days, nearly total depletion of the Ogallala



Specifically for Nebraska, our economic crops will shift to the north, and we will need to transition to crops from Texas. As the population eventually shifts more north, Nebraska will be used as a rest stop on the way to more habitable locations. We will experience a Dust Bowl greater than the one of the 1930s, caused by drought in summer and over precipitation in the winter. As climate change continues, central United States will act as a corridor between uninhabitable to habitable.

I have specifically left future dates off of the projected maps to avoid a

mindset that this issue can be pushed off for another day.

.The mapping is the two dimensional mapping I mentioned before that only goes so far as comparative mapping. However, from this research I was able to create moments in Lincoln as a result of change.



thebeneficiary2100

Edit Profile



2 posts

0 followers

0 following

The Beneficiary



theworker2100

Edit Profile



2 posts

0 followers

0 following

The Worker



thescavenger2100

Edit Profile



2 posts


0 followers


0 following




The Scavenger

In order for members of the general public to become engaged in the exhibition, I have created social media accounts for the three characters and posted images that share their story on a platform the majority of people use already. The goal here is to create an illusion that I am not an all-knowing creator, but the characters have a life of their own. Then as the public would come in to the exhibition they have already formed connections and alignments with the characters and can understand their architecture of their world as a subplot.



**thebeneficiary2100** • Following
Lincoln, Nebraska

**thebeneficiary2100** Office contemplation #minimalism #freshairindoors #workday #beneficiary
2d




1 like


2 DAYS AGO




Add a comment...

Post



**thebeneficiary2100** • Following
Lincoln, Nebraska

**thebeneficiary2100** City observation #abovetheclouds #droneshot #beneficiary
2h



1 like


2 HOURS AGO

Add a comment...

Post

The Beneficiary often shares their falsely humble lives through images of barebone locations few can afford.



 **theworker2100 • Following** ...
Downtown Lincoln, Nebraska

 **theworker2100** New Air Filtration System installed at the factory!
#easybreathing #lookingup #worker
37m

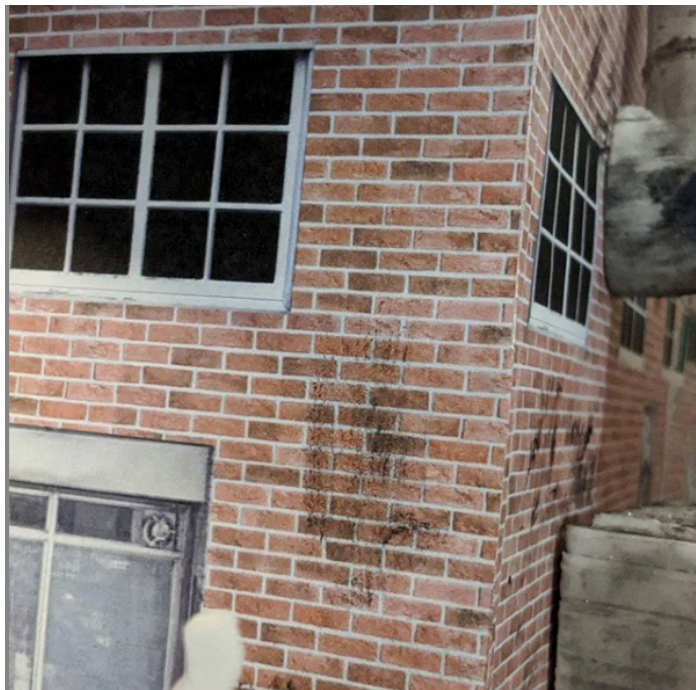
   

Be the first to like this

37 MINUTES AGO

Add a comment...

[Post](#)



 **theworker2100 • Following** ...

 **theworker2100** Might not be pretty, but it's home alright #lookingup #betterthannothing #worker
3h

Be the first to like this

3 HOURS AGO

Add a comment...

[Post](#)

The worker posts falsely positive messages as if to say they're doing the best with what they can, but things are looking up.



thescavenger2100
Downtown Lincoln, Nebraska

thescavenger2100 Any Scavs downtown should add this new gold mine to their route [#treasurenottrash](#) [#scavenger](#) [#reuse](#)
3h

Be the first to like this

3 HOURS AGO

Add a comment...

Post



thescavenger2100
Gateway Mall

thescavenger2100 We've started sorting today's haul, will be out for distribution before the storm hits [#treasurenottrash](#) [#factionssharing](#) [#scavenger](#)
1h

Be the first to like this

1 HOUR AGO

Add a comment...

Post

And The scavenger shares images to update other members of the group on any opportunities or activities for the day.

The Story Begins Now.



The year 2100 has become barely habitable. No ice sheets remain, no rain forests exist, rising sea levels have caused mass inundations far inland totally altering the geography of the planet. Humans have moved into the shrinking habitable areas. Drought and floods plague the earth. Inland temperatures have increased by at least 10 degrees Celsius. Sea are 20 m higher in some areas of the country, the unpredictability of the climate will see hurricanes throughout the planet of unimaginable ferocity.

In Lincoln, Ne mega-corporations grew as a result of a high consumerist demand to adapt to harsher conditions. Models of air purifiers are released as often as new phone, and with just as big of a fan base. The high pollution, erosion, and New Dust Bowl also attribute to the booming gas mask market.



In Lincoln, Ne mega-corporations grew as a result of a high consumerist demand to adapt to harsher conditions. Models of air purifiers are released as often as new phone, and with just as big of a fan base. The high pollution, erosion, and New Dust Bowl also attribute to the booming gas mask market.

Mega-corporations such as Mazaon have been a driving force behind climate change, have enough money to solve some of these issues, but continuously gain more money for no other reason than greed.

This previous Wal-Mart became overrun by Amazon, and became a new warehouse that exists for people to pick up groceries and acts as a garage for delivery drones.



The city is now far more dense given its land area as more people flee from natural disasters of the east and west. The residents of Lincoln had to adapt to smaller living and less comfortable living conditions. Those that benefited from a mega-corporation have built their palaces above the city.

suits because they must continue to work, and have a more industrial mask to wear. The mother and daughter pictured typically would not go out, and wear a thinner mask for their activity.

The gaps that typically existed between middle class homes became filled with shack-like conditions or a stacking of mobile homes to increase the livable space in the area. The change in climate also killed off most plant material in the area, leaving dead trees and dry soil as any form of nature.

Due to high pollution, erosion, and Dust Bowl, masks must be worn at all times. The men depicted are all wearing



As the Ogallala Aquifer depleted, water became privatized and under extreme government control. Standard access is only available to those of a higher wealth bracket. Citizens who can not afford a private source of water travel to public watering holes built on previous landmarks.

the beneficiary



the worker



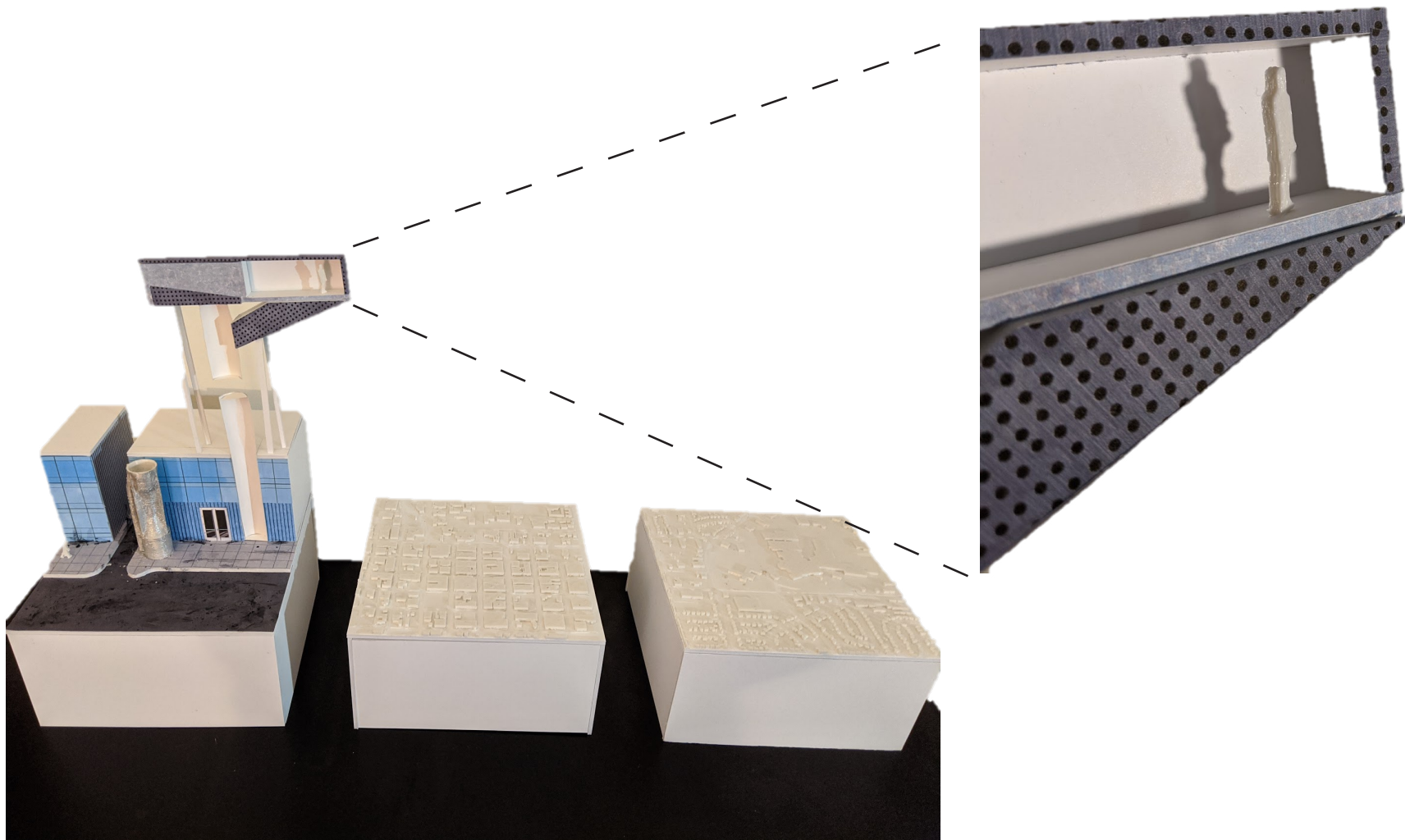
the scavenger



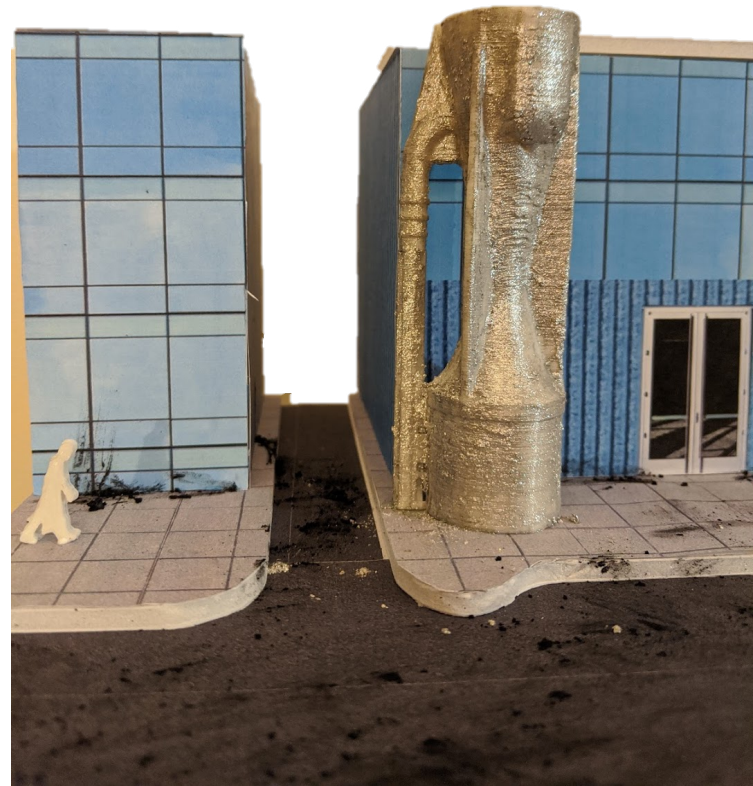
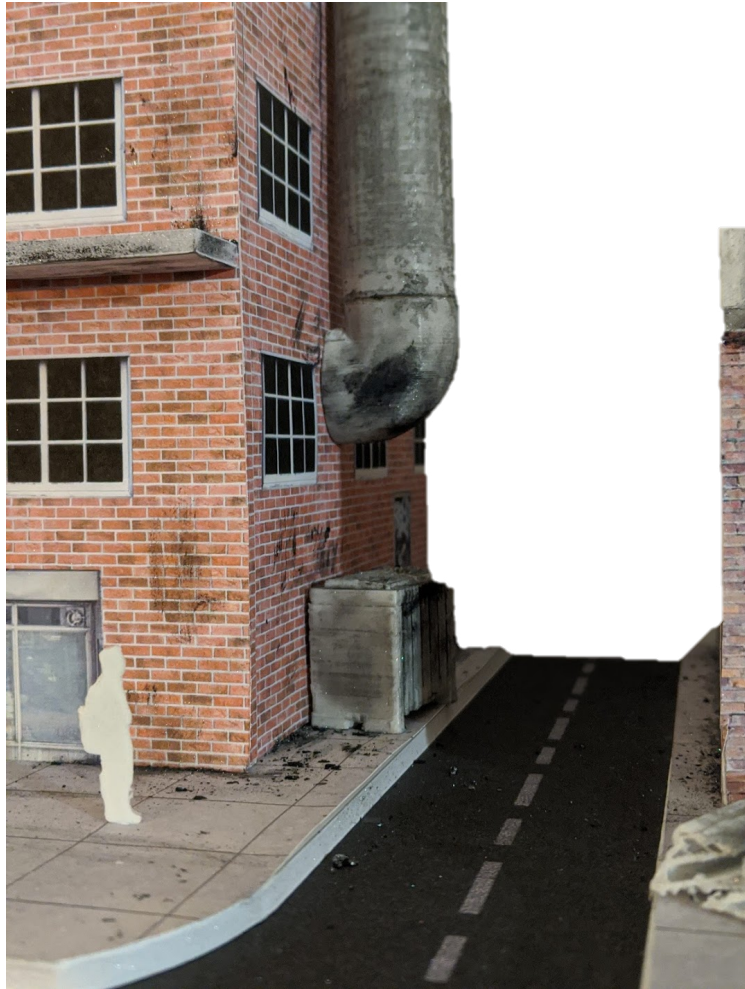
Three factions of people now exist. The Scavenger lives in spite of The Beneficiaries, The Workers, and The Beneficiary and The Worker. The Scavengers. While the world continued to change, they acted and reacted at their ability.

The Beneficiary created, hoping to improve the world, but only growing in personal gain. The more The Beneficiary created, the less in need the world appeared.

The Worker acts at the demand of the Beneficiary. The Worker is aware of the physical changes to the world, but is willing to buy products for adaptation. The life of The Worker is planned for highest productivity. The Worker complies to the demands of the Beneficiary in order to maintain an indispensable status. On the happenstance The Worker becomes disposable, they involuntarily become a Scavenger.



The Beneficiary acts as the head of the new generation of business magnate. As a part of the corporate elite, they push consumerism as a means to gain more profit and stay in power.



The Worker belongs to the Labor Pool class, the largest class population in 2100. The worker has aspirations to make it out of the Labor Pool class, because they view themselves as a temporarily displaced Beneficiary. Their own livelihood is considered collateral damage as long as there's a promise of success in reaching the Beneficiary class.



The Scavenger is the lowest class of people. They exist from the result of society and consumerism advancing the lives of those who can afford it, and The Scavenger was left behind.

In order to survive The Scavenger lives by combining scraps of the built environment.

8:00 am
Waking Hour



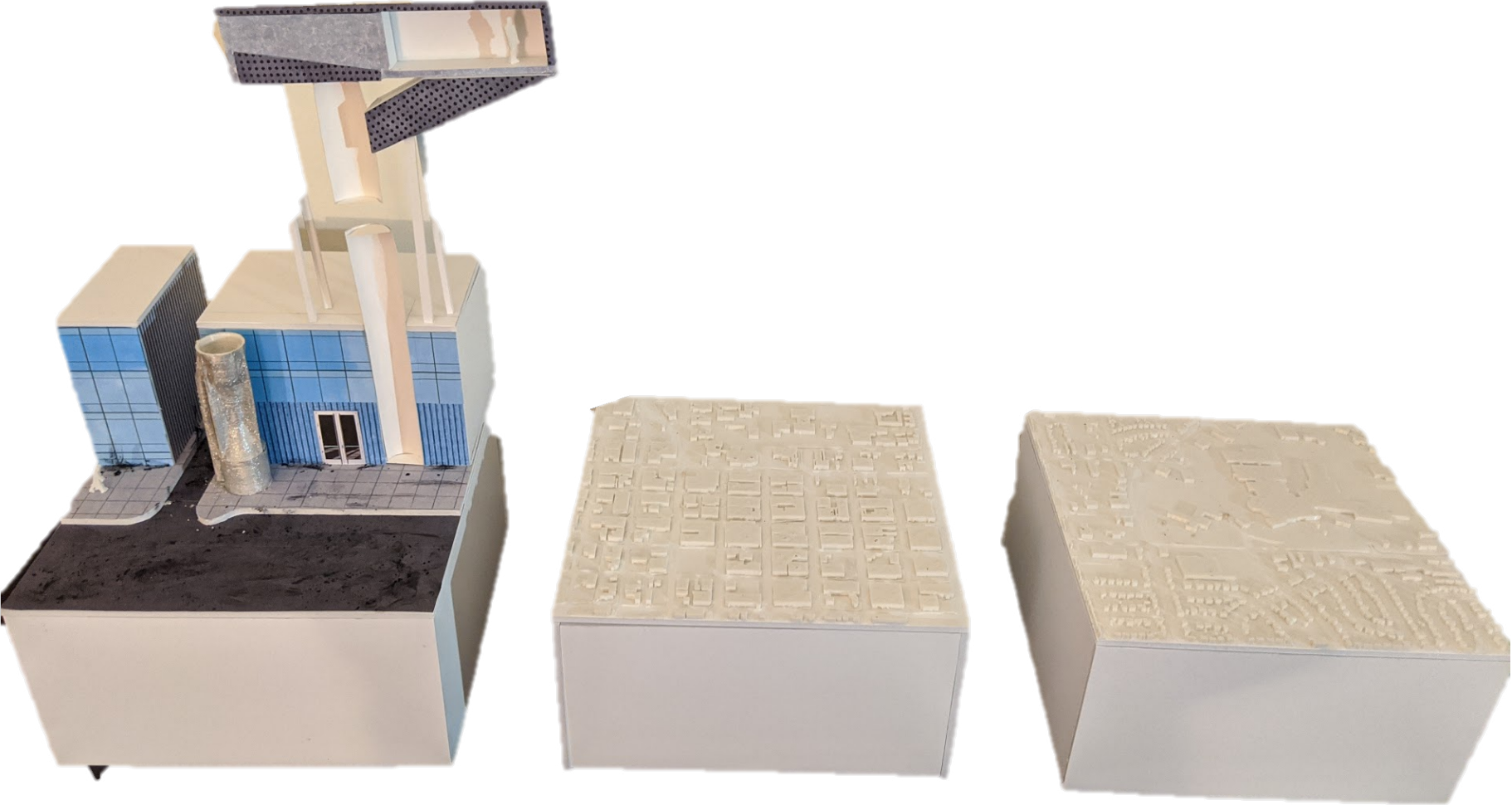
Faction Relationship: Worker + Scavenger
Resource: Water + Food

Starting at 8am, this model running down the center. narrates the 'morning routine' of the worker and scavenger.

The worker lives in a standard apartment home, located downtown Lincoln above a business. The scavenger faction lives and gathers in abandoned buildings, the building here is the food court of the Gateway mall, as the need for physical shopping will be replaced by all online shopping, places such as the mall will become a discarded piece of architecture.

In thinking about morning routines, activities revolve around food and water. This model shows two widely separated locations within Lincoln, therefore this model acts as a section model, marked by the white strip

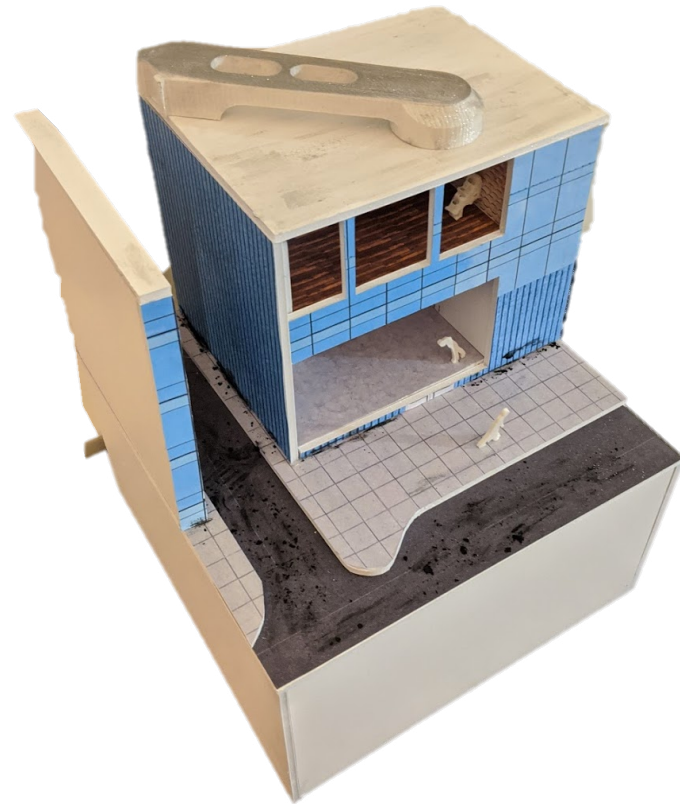
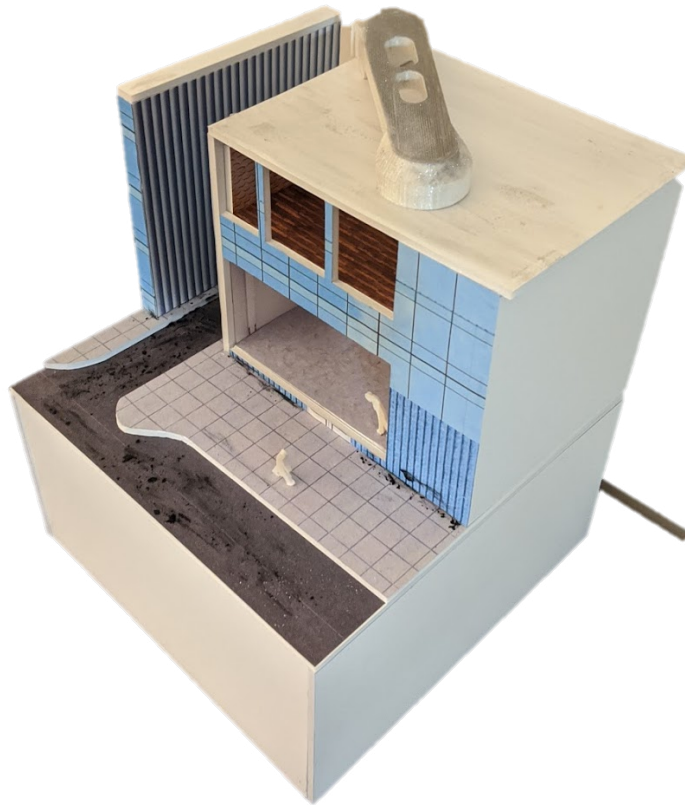
9:00 am
Morning Rush Hour



Faction Relationship: Worker + Scavenger
Resource: Water + Food

Starting at 8am, this model narrates the 'morning routine' of the worker and scavenger. The worker lives in a standard apartment home, located downtown Lincoln above a business. The scavenger faction lives and gathers in abandoned buildings, the building here is the food court of the Gateway mall, as the need for physical shopping will be replaced by all online shopping, places such as the mall will become a discarded piece of architecture. In thinking about morning routines, activities revolve around food and water. This model shows two widely separated locations within Lincoln, therefore this model acts as a section model, marked by the white strip running down the center.

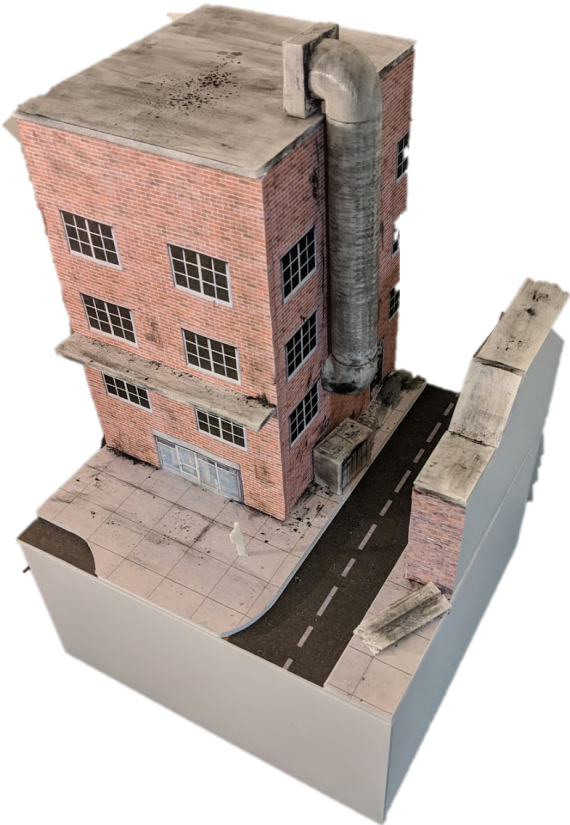
12:00 pm
Lunch Break



Faction Relationship: Worker + Scavenger
Resource: Water + Food

This model shows the inner workings of the beneficiary's business and the air quality resources between beneficiary and worker. The beneficiary has privilege to a private air system reserved for the upper elite, whereas the air quality for the worker's work-stations are mundane and considered add-on architecture. They provide a minimal benefit to the air outside the building.

2:00 am
Night



Faction Relationship: Worker + Scavenger
Resource: Water + Food

In this scene, I wanted to include a moment of the scavenger in search for goods and materials, through what the other two factions throw out into the world. I also want to compare the source of electricity/light of the streetlights compared to the electrical system of the building. The streetlight itself using solar energy and the building adapting to the system we have now.

conclusion

The use of models brings a physicality to architecture that will never be ignored by the profession. They're used to celebrate and enhance our projects to a physical understanding before a project is fully built.

The exhibition format itself then actually steps away from the idea that the models are purely architectural and creates a story for the characters.

Storytelling is typically a cognitive experience, but the exhibition brings in a physical reaction to elevate the viewer's involvement and understanding. This, along with the social media aspect, allows this thesis to reach a multitude of people outside the architectural world.

On a continuation arch, I'd further this thesis by expanding on the how micro-relationships expand into the macro of the world. At the beginning of the year I asked, what is our future at the hands of climate change, and I have found no concrete answer. What I have presented is one foreseeable option, but as we know from the last few months we can't be sure of what's coming our way.

In this storytelling of climate change, the factions become socially isolated from one another, as they believe the others are to blame. What we can be sure of, is that there is no one faction of people responsible for our future, and we all have our role.

Initially, I stated that architects have to remake the built environment so that it produces a less harmful result, or to carry on and live with the consequences. However, the age of online activism has allowed for all to share their opinion, and architecture is a built portrayal of those voices.

The question what is our future at the hands of climate change now evolves to what is our future at the hands of everyone? What foreseeable options can you live with?

bibliography

Abyzov, Vadym. "Modern Conditions and the Impacts of the Creation of Architectural Environment." IOP Conference Series: Materials Science and Engineering, October 2017. <https://doi.org/10.1088/1757-899x/245/8/082050>

Anselm, Akubue Jidefor. "Building with Nature: Ecological Principles in Building Design." Journal of Applied Sciences, 6: 958-963, 2006.

Brandt, Denise Hoffman and Catherine Seavitt Nordenson. *Waterproofing New York*. New York, 2016.

Brownell, Blaine. "Natural Resources as Architectural Capital." Architect, December 21, 2015. https://www.architectmagazine.com/technology/natural-resources-asarchitectural-capital_o

IPCC. "Global Warming of 1.5°C." 2018.

Kallipoliti, Lydia. *Geospatial Ecologies*. New York, 2017.

Keith, Vanessa, and StudioTEKA. *2100: A Dystopian Utopia, The City After Climate Change*. 2017.

Latour, Bruno. *We Have Never Been Modern*. Harvard University Press. 1991.

Lynas, Mark. *Six Degrees, Our Future on a Hotter Planet*. National Geographic Society. 2008.

Whittaker, Ian K. "Architectural Energy Depletion: Managing Transition." E-Architect, July 3, 2012. <https://www.e-architect.co.uk/articles/architectural-energy-depletion>

